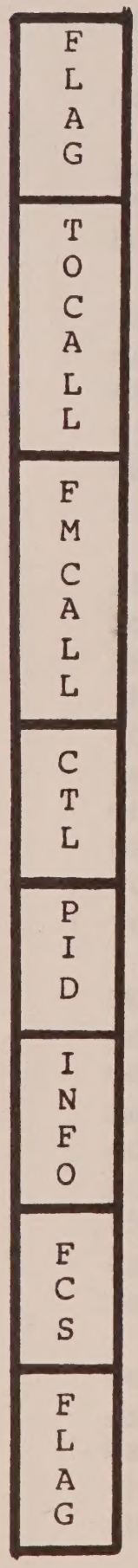
VOLUME 1, NUMBER 5
NOVEMBER, 1982

NEW PACKET STANDARDS



Standard opening HDLC flag byte (01111110)

The destination call-sign (6 characters plus sub-station ID code)

The source call-sign (6 characters plus sub-station ID code)

Standard HDLC control byte

Protocol Identification byte for information frames

Information field in information frames

Frame check sequence

Closing flag byte

DEC LOMA

CONTROL

identifies the purpose of the packet

Participation has always been a problem with groups. SLAPR is apparently no exception. At this point there are almost as many non-members who have registered their ideas by way of the questionnaire as members. Participation in the electronic newsletter was limited to four members. If they learned nothing more, it was that there are still some bugs to be worked out in that system before it is ready for the packet. But how are we going to know what problems must be overcome if we don't get involved? Ok, Ok, I know that not all have modems compatible with our 103. But that can't be said for the lack of participation on the 145.05 porpagation tests. Sure, I expect everything to work 100% the first time that I fire up my BETA BOARD. I know you do to. But have you taken the time to make any of the preliminary checks and tests? Try again?

ELECTRONIC SLAPR PROTOCOL
November 21 - 0400 - 1800 GMT
618-656-8154 We'll also try a 314 number.
Check 145.65 for help and possible 314 #.
73, Gus, W9OFZ

ournovembermeetingnovembermeetingnovembermeeting

The November meeting WILL feature Jeff Eirvin. All seems in order for November 29th. Jeff will go through the steps to design the BETA BOARD. I've seen the design. Its really well done.

Last month's "show stopper" is NOW in hand. It is actually HERE. I look forward to taking a look at KA9Q's visualization of good old planet earth from a Phase IIIB type orbit.

November 29, 1982 7:30 PM
GRAND TETON ROOM
DEACONESS HOSPITAL

station to access long distance communications

October 20, 1982

Pete Eaton, WB9FLW
35 Norspur, Rt. 4
Edwardsville, IL 62025

The Chicago area Beta Test Group held its first meeting on October 12th, with 10 persons attending. The first order of business was the viewing of the 90 minute VCR cassette on Packet Radio obtained from you on your recent visit to our area.

After viewing the tape, we discussed the possibility of starting a formal Chicago Area Packet Radio Club similar to the club formed in the St. Louis area. It was decided, however, to temporarily table this issue until more local people become involved in order to have a broad enough base for the selection of officers. It was generally agreed that at present our time could be better utilized in preparation for Beta Testing.

We also decided to establish an informal packet net on a simplex 2-meter channel in order to determine what steps must be taken to link all members of the Test group together. In addition, it was agreed to investigate the possibility of making a group purchase of either 450 MHz or 220 MHz equipment, although it is assumed initial operation will take place on two meters.

We would like to express out thanks for your excellent presentation at CFMC'S EXPO '82 Hamfest, as well as your co-opration in making the Video Cassette available to us. Your enthusiasm is contagious!

Dick Gulbrandsen, WD9DBJ

CONNECT: BETA BOARD SOFTWARE

Now that the Beta hardware is well on its way to being a reality, the most asked question seems to be "What about software?" I have had several discussions with both Den and Lyle and if their ideas come to pass then we won't be disappointed.

TNC software has two basic pieces: the TIP or Terminal Interface Program, and the LIP of Link Interface Program. The TIP provides the interface between the TNC and the computer (and it's operator). This is the part that not only passes data between TNC and terminal, but also allows commands to be passed between operator and TNC and keeps track of many basic housekeeping functions including terminal characteristics, station callsign, etc. The LIP builds and sends packets and operates the radio interface.

Obviously there is more than one way to program these functions and it appears that Beta participants will have three different software versions to choose from. The version that will be supplied with the Beta boards will be an assembly language version of Vancouver software. This software will allow basic station to station communications and provide a stable environment for ironing out any latent bugs. This will be followed by the Forth version. It provides the enhanced LAN features including systat tables, dynamic addressing and the TAPR digipeater. The final Beta software will implement the new AX.25 protocols that were established at the AMSAT meeting last month. This software is being jointly developed by hams in Tucson and Los Angeles and has a number of significant benefits:

High level language (UCSD PASCAL)
Compatibility with TAPR and Vancouver
Multiple digipeaters in a LAN
Both LAN and internet capabilities
Nationwide acceptance

It's obvious that the activity has shifted. We have TNC hardware that can accommodate 24K of ROM. Many software enhancements are forthcoming.

DISCONNECT: BILL, WDØETZ

BETA BITS

by Pete, WB9FLW
Beta Test Site Coordinator

Well believe it or not Beta is under way. Jeff has completed his layout work for the circuit board (a true work of art) and delivered on 4 November to Tucson the negatives for the board. Also, thanks to the efforts of Tom Brickey, WBØWRK, we are getting several prototype boards made at C & C Industries in Fenton, Mo. They should be in Tucson's hands no later than 9 November for Beta Prototypes to be tested. This way we can make darn sure we haven't overlooked something before the actual Beta circuit boards are produced.

Finally, below are listed the poor souls that have endured all these many months of frustration and have still decided to support this project. Thanks folks!!!

RUSS BEARD K9LXV
RUSTY BEARD KA9LMM
JUDY BEARD KA9NDX
TOM BRICKEY WBØWRK
VON DEEKE WB9KDY
ED DILLON KAØAYO
PETE EATON WB9FLW
FRANK GOERINGER NØDVS
GUS KUETHER W9OFZ
SCOTT KUETHER KA9AKM
RICHARD MARTIN
RICHARD PAGENDARN KL7HSY
LEONARD PARIS KD9S
GILBERT PAULS WØWKJ
MIKE PETZ KA9HNT
BILL REED WDØETZ
FRANK SPAVALE KAØNSO
ERNIE STEPHENS NØBKH
TOM VOGEL WAØKGU
LES WELCH KA9KAY
MEL WHITTEN KØPFX

SLAPR ROSTER CONTINUED

W5CAT CHARLES GUILLORY
44 WASHINGTON PL.
EDWARDSVILLE IL 62025
618-656-7922

KØPFX MEL WHITTEN
3219 HAAS AVE.
BRIDGETON MO 63044
314-739-4122

WB4NCQ CLIFF GREENE
3921 SCHILLER PL.
ST. LOUIS MO 63116
314-481-2633

WBØROT WILLIAM SIMMONS
119 WEST MORGAN ST.
BOONVILLE MO 65233
816-882-5883

FSC

Oct. 24th, 1982

Dear SLAPR,

A packet repeater is a REPEATER and must be in the repeater sub-bands.

145.65 is not.

Hank, KA6M

p.s. We use 146.58

#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#2#

Congratulations to KV7D AND KD2S for the time job on Packet Status Register, Number 2.

FMCALL

SLAPR PROTOCOL is the official newsletter of the St. Louis Area Packet Radio Club. You are invited to share and disseminate any or all of the information contained in this issue or any other. It is requested that you give credit to both the author and SLAPR PROTOCOL.

Please address all inquiries to SLAPR
1309 Gloucester Dr
Edwardsville, IL 62025

4 Nov, 1982

Dear Pete,

I read your letter in the recent issue of Packet Status Register and am very interested in getting a copy of the tape you made last summer in Tucson. Am sending a cassette and enough to cover the return postage.

I have five fellows lined up here in Colorado Springs to participate in Beta testing. Got them all signed up as TAPR members and just sent in all of our checks to Dan to get our boards when they are produced. We are fortunate in having some real talent in the group which is a good thing as my talents are not at a level which would keep a Beta board running very long I am afraid.

I do appreciate your offer to reproduce the tape. Anything that we can get on the subject of Packet Radio will be of real value to us.

Thanks, and 73,

Andy NOCCZ

Nov 1,1982

Dear Pete,

Ive been thinking about writing to you for quite a while. Saw your name several times in Ham Trader Yellow Sheet selling gear and once in QST or 73 or CQ Want Ads. Makes me wonder if you're gearing up for more and more packet radio or just waiting for a job... (a little of both actually) Hope things are going well for you in that respect.

You've done wonders with packet organizing in the St. Louis area. I commend you for your efforts.

Thank you for the two SLAPR issues you have sent, #3 & #4. If you sent #1 & #2 to New Jersy they never made it. If you have extras of the first two issues could you forward them to Florida? I'll enclosed the $10.00 for SLAPR membership in order to stay on your 1982 mailing list.

I have my Vancouver TNC board operational but no one to talk to. I'm making a last minute push to find two people to join me in ordering

TAPR boards so we can get going here. Wish I was near the N.J. gang for Packet Radio purposes but otherwise Florida is very nice.

73
Gwyn Reedy
Brandon, Florida

BETA PROTOTYPE BOARD OPERATIONAL

Late Thursday evening Nov 11th I got a call from Lyle Johnson WA7GXD in Tucson to inform me that he had one of the prototype circuit boards operational that we had sent him a few days earlier.With that the Beta board layout was put into production (ie parts ordered and circuit board drill mask made). The Beta project totals are 19 Beta Sites with a little over 150 boards ordered.

Congratulation Lyle,
and TAPR

Pete WB9FLW

the field that contains the message being sent

NATIONAL AGREEMENT OF PACKET RADIO STANDARDS

by Hank Magnuski, KA6M

As part of the October 10th, 1982 AMSAT (Amateur Satellite Corp.) general meeting, president Tom Clark, W3IWI, invited a number of leaders of active packet radio groups to come to a special working committee meeting on Friday, October 8th, to discuss the future development of AMICON, the AMSAT International Computer Network, and a new project tentatively called PACSAT I, a low-altitud orbit, all digital store-and-forward transponder. To Tom's great surprise, a number of people showed up, representing these groups: New Jersey - Phil Karn, KA9Q; Tucson Area Packet Radio (TAPR) - Den Connors, KD2S and Lyle Johnson WA7GXD; ST.Louis Area Packet Radio (SLAPR) - Pete Eaton, WB9FLW; AMRAD (a big WAPR) - Paul Rinaldo, W4RI, Dave Borden, K8MMO, Terry Fox, WB4JFI, Bob Carpenter, W3OTC, and Eric Scace, K3NA; the Pacific Packet Radio Society - Hank Magnuski, KA6M; AMSAT - Tom Clark, W3IWI, and Jan King, W3GEY.

Even more surprising is that this diverse group managed to agree on some things. In fact, the agreement reached on adopting a common link level protocol may prove to be extremely significant in forming the foundation for U. S. packet radio networking. The meeting which originally was supposed to iron out some AMICON details managed to have much more of an impact. Here's some background on what happened:

A year ago, in conjunction with the '81 AMSAT general meeting, Paul Rinaldo organized the first Packet Radio Networking Conference which was held at the NBS in Washington (some excellent conference proceedings are still available). Many ideas and some real and paper networks were

discussed. In the months which followed quite a few people got their packet radio controllers running and had a chance to experiment, read, discuss and think about various problems involved in implementing PR networking. The situation became discouraging. It seemed like a new protocol was proposed for each TNC that came on the air. Each group started heading off in a different direction. The promise of compatible systems grew remote.

But in this dispersion of effort people also found out how difficult it was to implement private protocols and how difficult and interconnection would be if common ground wasn't found. The different groups also came to realize that there was a common set of problems to be solved and that one area's solution couldn't ignore the requirements of other users. The summer doldrums saw very little activity and not much progress, and provided the background for the AMSAT meeting.

The AMICON Network

Two major areas of concern filled the agenda of the AMICON meeting: the modulation methode to be used for the Phase IIIB special service digital channel, and the protocol to be used for linking two ground stations via the satellite.

There was a lot of discussion on the modulation methode, and Den Connors and Lyle Johnson of TAPR and Paul Rinaldo of AMRAD presented their research findings. Many different modem types were reviewed and international requirements were discussed. After all the debate the following conclusions were reached:

1. The L1 SSC will be restricted to 5 kHz bandwidth (at the 26db points). Modem performance is a primary consideration for a groundstation, and the modem used will probably be of a fairly advanced design.

2. The use of 2Ø2 using NBFM-AFSK will not work.

3. The use of 202 modems using SSB-FSK will produce marginal results.

4. A 1200 bps channel speed is probably optimal, as this speed satisfies a variety of different constraints and requirements.

5. The BPSK modulation methode developed for IIIB telemetry should be explored at both 400 and 1200 bps.

6. The AMRAD and TAPR groups are going to pursue development of a modem which employs Minimum Shift Keying (MSK). MSK is considered the most promising methode at this time.

7. The SSC will have to be open for different experimental approaches until there is general agreement and experimental validation of "the" methode.

Considering all of the alternatives which were discarded, the above resolutions represent a significant narrowing of focus. If that wasn't enough, more was yet to come!

Eric Scace reviewed the work which had been done by NJ & AMRAD packeteers to adapt the international X.25 protocol to amateur needs. The amateur sub-set has been documented by Terry Fox, and is now called AX.25. Hank Magnuski distributed a tutorial document on connectionless protocols and software. This is the first implementation of software utilizing amateur calls only for addressing.

By the evening of the 8th the group began to recognize that only minor differences separated the AX.25 and the LIPM.04/TIPM.04 approaches. The TAPR protocol users were willing to implement an interface based on the recommendations which would come out of the meeting. The differences were resolved and led to the unanimous adoption of a set of protocol (specifically, ANSI X3.66 ADCCP-HDLC BA Class, with options 2, 4, 7, 8, & 11).

Why is this important? First, this link level protocol allows two AMICON groundstations to construct a packet pipeline. This same protocol can be used between two stations in a terrestrial backbone net. The same protocol can be used terminal-to-terminal and terminal-to-terminal via a simplex packet repeater. It is a slight extension of the X.25 LAPB link level protocol. Finally, it does not restrict future development of ISO level 3 virtual circuit or datagram protocols.

The key feature of the new design is the adoption of a scheme for using call-sign addressing in a packet. The packet format looks like this:

```
-----------------------------------------------
!FLAG!TOCALL!FMCALL!CTL!PID! INFOFIELD !FSC!FLAG!
-----------------------------------------------
```

where: FLAG Standard opening HDLC flag byte (Ø1111110)

TOCALL The destination call-sign (6 char's plus sub-station ID code)

FMCALL The source call-sign of (6 char's plus sub-station ID code)

CTL Standard HDLC control byte

PID Protocol identification byte for information frames

INFO Information field in information frames

FCS Frame check sequence

FLAG Close flag byte

Frames to be repeated by a local area network simplex packet repeater also contain a third address field following the FMCALL field. This third field is a call-sign of the repeater. More details on this protocol will be published in the revised AX.25 document.

Collectively, the group considered nearly every design which starts out with a statement something like this: "Holy 8Ø7's, look at all the overhead bytes you have in using call-sign addressing. I can do it with just 4 bits." We have found that these other schemes have their own defects and that the penalty for the call-sign overhead is relatively small in comparison to other delays on the link and in view of the other benefits.

The AMICON session ended with promises from various members to try to emplement the required versions of this new protocol. In the interim, LIPM.Ø4/TIPM.Ø4 will be used by AMICON groundstations until the new software is ready.

PACSAT

Tom Clark described a potential opportunity in the late '84 timeframe for a new low-altitude orbital launch. Tom reviewed various considerations which led to the concept of building a satellite which would be an all digital store-and forward transponder - a flying mailbox. This satellite would have a computer, two and more digital serial I/O channels, appropriate modems, and 1/2 to 1 megabytes of on-board memory. Messages put in on one side of the earth could be extracted on the other side. The operation would be somewhat like using a CBBS, but only for 15 minutes at a time!

Tom proposed a preliminary design, and there was an extended discussion of the pro's and con's of the project. Various implementation ideas were suggested. Den Connors and Lyle Johnson agreed to put together a more detailed PACSAT proposal for Saturday, and presented it at a seminar on the 9th.

The project concept was presented at the AMSAT general meeting, and since no opposition was raised, further development of the PACSAT is expected.

FLAG

identifies the beginning or the end of a packet

With the coming December issue of SLAPR PROTOCOL the St. Louis Area Packet Radio Club will be at the end of the "trial period" for the organization. 1983 will bring with it several decisions that need to be made about our fledgling club and its changing nature. It has taken much longer than anticipated to get our paper packet system operational. We had to fill the void with other preliminary activities. There has been an advantage with the delay. It has given us time to get organized without making hasty decisions. Our easy unstructured approach has been acceptable up to this point but as the transition takes place from the paper to the real network, we must face some new challenges. The newsletter will go electronic by the first of the year (saving the club substancial funds). Then comes the upkeep of the digipeater and possible satellite uplink. Are meetings really required every month? I have kicked myself more than once for picking Monday night for meetings (the NFL players' strike had saved us much trouble). From the questionnaires returned last month we have a feel for what the membership thinks. The executive board will be making some recommendations based on your input.

Being actively involved in the layout of the Beta board project, I've come to appreciate what a mammoth undertaking this whole project is. The actual circuit board measures 8"x8" with only the transformer off board. Start looking for a box to put the thing in. Make sure your 2 meter rig is up to snuff on 145.65 MHz. Be sure you have on hand a spare mic and speaker plug for the TNC. By the time the next issue of SLAPR PROTOCOL comes out the Beta folks will have a board and the P for Packet in SLAPR will be more than only a name.

73, Pete, WB9FLW

SLAPR PROTOCOL
ST. LOUIS AREA PACKET RADIO CLUB
1309 GLOUCESTER DR.
EDWARDSVILLE, IL 62025

****
* PACKET RADIO *
* ON *
* EMC/80 BBS *
* 314-645-1047 *
* TRY IT *
****

NEW GATHERING PLACE
145.650

HANK MAGNUSKI KA6M
311 STANFORD AVE

MENLO PARK, CA 94025

NEXT SLAPR MEETING
CIRCUIT BOARD DESIGN
7:30 PM ON NOVEMBER 29, 1982
GRAND TETON ROOM, 7TH FLOOR
DEACONESS HOSPITAL
6150 OAKLAND, 40 AT HAMPTON
ACROSS FROM FOREST PARK
ST. LOUIS, MO